# The Nociceptive Blink Reflex in Migraine:

# An investigation of endogenous and exogenous modulators on the trigeminal nervous system in migraine sufferers.

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# Declaration

I declare that this thesis is my own account of my research and contains as its main content work which has not previously been submitted for a degree at any tertiary education institution.

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## Abstract

The purpose of this thesis was to determine whether the blink reflex in response to a supraorbital electrical stimulus was a useful marker of activity in central and peripheral nociceptive processing pathways during and between attacks of migraine. In particular, the blink reflex was used to assess trigeminal nociceptive activity in migraine sufferers and to investigate the influence of various exogenous and endogenous modulators on this reflex. It was hypothesized that migraine sufferers would be subjectively and physiologically hypersensitive to both environmental (exogenous) and internal (endogenous) factors. This hypersensitivity was investigated both through subjective ratings and physiologically with blink reflex parameters in response to trigeminal stimulation with and without administration of a noxious compound (ingestion of hypertonic saline) and various environmental stimuli (light, heterosegmental cold pain). Topical application of a local anaesthetic agent inhibited the nociceptive blink reflex measured in response to a concentric electrode stimulus in healthy controls. However, in headache-free migraine sufferers, the nociceptive blink reflex was less likely to be affected by the local anaesthetic. Migraineurs and controls were equally susceptible to peripherally induced nausea evoked by the ingestion of hypertonic saline. However, nausea increased headache and scalp tenderness in all participants, and trigeminal irritation increased headache. Migraine did not affect any blink reflex parameters evoked by a weak electrical stimulus to the forehead. However, symptoms of migraine, scalp tenderness and painfulness of conditioning stimuli were all rated as more intense during a migraine attack, suggesting that temporal summation of trigeminal nociceptive stimulation evoked supraspinal central sensitisation. Whilst there was some evidence of interictal sensitisation in migraine sufferers, this would be better investigated with test stimuli that strongly activate nociceptive afferent fibres in terms of spatial and temporal summation.

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